ASTER Science QA: Lessons Learned

QAWG

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Agenda

- **Some Specific Features**
- **Overview of QA Flow**
- **Data Product Status**
- **Methods and Procedures**
- **Lessons Learned**

Some Specific Features of ASTER Science QA

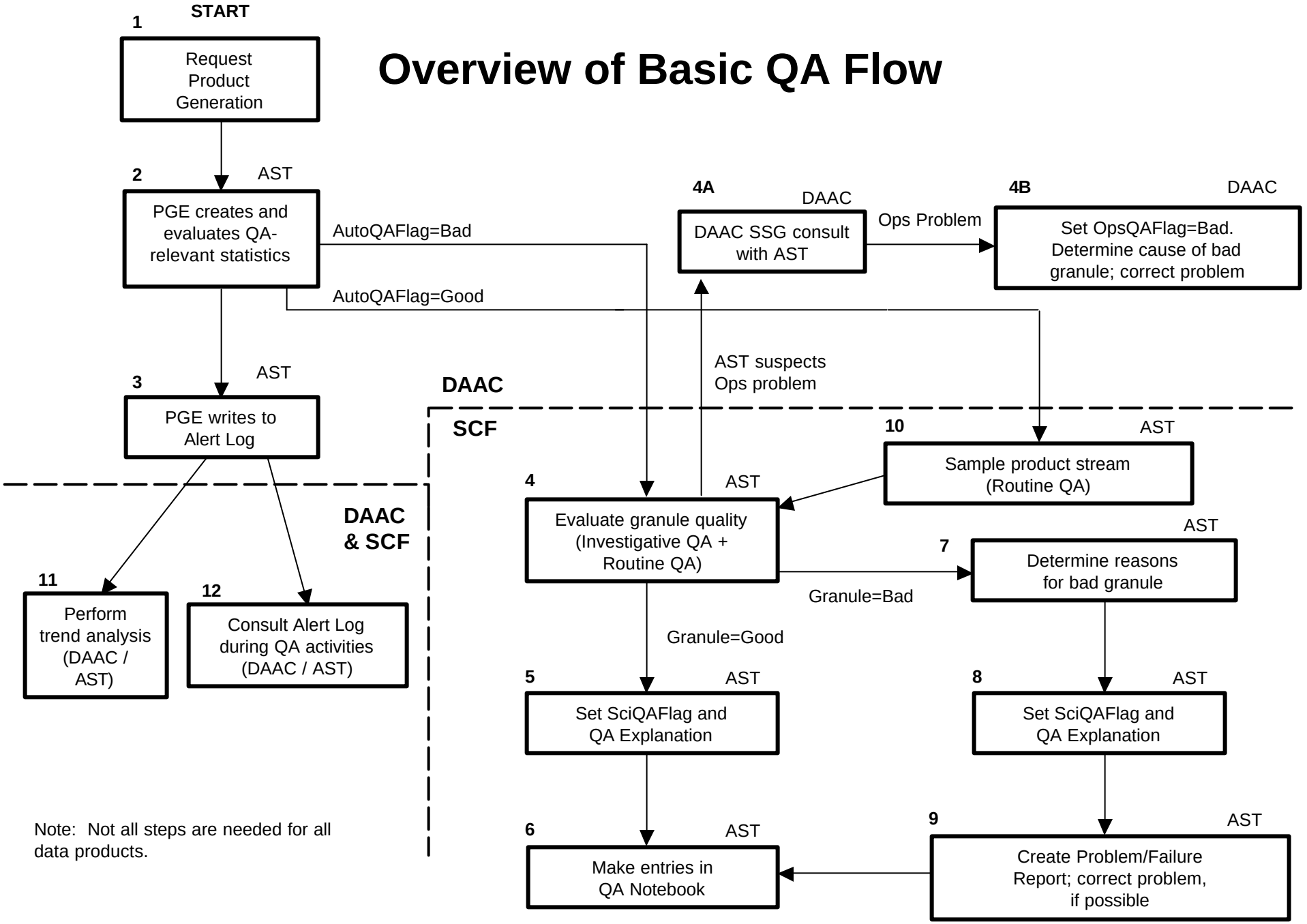
- **Alerts: QA-relevant summary statistics are calculated within the Level 2 PGEs for each granule (e.g., the percent of bad pixels in a scene.)**
  - **When any of these summary statistics is outside their assigned ranges, an "alert" is raised.**
  - **Ranges are stored in a look-up table and can be easily changed to reflect improved knowledge.**
  - **Alert information is written to an archived Alert Log and to the data product header for end-user's reference.**
- **Data Planes: Each ASTER data product will have one or more data planes containing pixel-level QA information.**
  - **These planes are created in addition to the science data planes and map to the science data on a pixel-by-pixel basis.**

Some Specific Features of ASTER Science QA

- First QA plane: Common structure for all data products.
  - » Each pixel will be marked as Good, Bad or Suspect, and its cloudiness noted.
- Second QA data plane: optional.
  - » Structure varies according to data product.
- Both data planes: Simple graphical display of bad data and other QA information
  - » Easy to see where scenes were most affected

- **Data Product Sampling: Determined by complexity of algorithm and dependence on external data sources.**
  - Number of products examined based on daily number of granules produced, percent to be examined and resources available to do the QA.

Overview of Basic QA Flow



Note: Not all steps are needed for all data products.

Data Product Status

- **Currently publicly-released are:**
  - **Decorrelation Stretch**
  - **Brightness Temperature Separation**
  - **Atmospheric Correction-VNIR/SWIR (Surface Reflectance and Surface Radiance)**
  - **DEM (N.B.: QA done at DAAC with involvement of algorithm developer.)**
- **Public release expected soon:**
  - **Atmospheric Correction-TIR (Surface Radiance-Thermal)**
  - **Surface Kinetic Temperature and Surface Emissivity**
- **Decorrelation Stretch and Brightness Temperature Separation are based on well-proven algorithms and their QA needs are low.**

Methods and Procedures

- **ASTER uses cw_look, an IDL-based package developed by Duane Kiefer of the ASTER PGS**
- **cw_look can:**
  - **Open and display HDF, HDF -EOS and other file types, including display of the embedded metadata files (e.g., coremetadata.0, productmetadata.0, etc.)**
  - **Do simple image processing tasks, such as:**
    - » **contrast enhancements**
    - » **zooms**
    - » **pans**
    - » **3-D display of brightness values**
  - **Save images as GIF, JPEG or TIF**

Methods and Procedures

- **ASTER-US produces only Level 2 data products and we QA only those products.**
- **Subscribed to all Ingest data notifications and store the resulting email messages for sorting and searching**
  - **Based on the data in the notifications, sample data products for QA based on geographic location, date of collection or date of processing.**
- **Use EDG to order data products for ftp pull.**
  - **Use lat/lon and/or time constraints, as Granule ID searching of ASTER data products has not been available for much of the mission to date.**
- **Examine data products according to the QA guidelines in the QA Plan.**
  - **Guidelines were agreed upon with the algorithm developers**

Methods and Procedures

- **Data production delays have delayed Science QA operations and true Science QA is just getting started.**
- **Most ASTER QA thus far has been done by the algorithm developers (e.g., metadata errors, SWIR misregistration.)**
- **Resources dedicated to formal Science QA have been limited.**

Lessons Learned

- **Algorithm developers need to acclimate to the availability of alerts and QA data planes**
  - **Even though they were developed with the science team and approved by them, these are new concepts**
  - **Science team still learning how to use them**
  - **Salesmanship needed on part of QA developers**
- **Concept of alerts does appear to be useful**
- **Data plane concept still being evaluated**
- **Be flexible as to schedule and procedures, which will change no matter how well you plan or how thorough your QA Plan document is**

Lessons Learned

- **Devote sufficient resources for the level of QA you have committed to.**
- **Important to have QA personnel be closely allied with PGS.**
  - **Knowledge of PGS and DAAC procedures was often as important (or more important) than the science knowledge needed for QA per se.**
- **Maintaining a good working relationship with the DAAC was key to resolving processing and QA issues.**